

Dynamic thinning of the ice streams draining into the Amundsen Sea, West Antarctica.

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Satellite radar interferometry data collected by the ERS SAR instrument over Pine Island Glacier (PIG) and Thwaites Glacier (TWG), West Antarctica suggest that these two glaciers (or ice streams) are thinning rapidly, by several meters per year. One piece of evidence for the thinning trend is that the mass flux at the glacier grounding line exceeds the balance flux from the interior by 8 percent (of the total accumulation) for PIG and 37 percent for TWG. The floating section on PIG remains cohesive along 50 km, and has exhibited a remarkably stable ice front position since the 1970s although it seemed to have retreated from its 1966 position. TWG desintegrates almost immediately passed its grounding line, producing numerous icebergs which for the most part remain glued together to form a non-cohesive ice tongue. Although TWG and PIG are probably at different stages of desintegration, the two ice streams may be in a different stage of disintegration, they both exhibit remarkably similarity in grounding line ice velocities and ice fluxes, with no detectable change in ice velocity. The second evidence for rapid thinning is the retreat of the glacier grounding lines between 1992 and 1996. The retreat rate is 5 km in 4 years for PIG and (tentative) 2 km for TWG. The corresponding glacier thinning rate is 3.5 m/yr for PIG. Such a change in ice thickness is much larger than can be accounted for by changes in accumulation, which suggests that the glaciers are thinning dynamically, through excessive creep. One likely trigger of the retreat has been the progressive desintegration of the coalescent PIG and TWG ice shelves which used to restrain ice sheet flow into the Amundsen sea as recently as 100-1,000 years ago.

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